



Ethics of AI in Hematology Practice and Clinical Research

Gregory A. Abel, MD, MPH
Dana-Farber Cancer Institute

GIMEMA International Meeting
New Frontiers in Hematologic Research:
Quality of Life and Artificial Intelligence
October 2, 2025



Dana-Farber
Cancer Institute



Disclosures

- **Consulting**
 - Geron
 - Novartis
 - Broad Institute
 - Institute for Value Based Medicine
- **I am a**
 - Hematologic Oncologist
 - Care Delivery Researcher
 - Bioethicist
- **I am not a**
 - Computer Scientist
 - Artificial Intelligence Researcher
 - Lawyer



Objectives

- Introduce AI and hematology
- Ethics of AI and health care: old and new
- Framework for ethical use of AI in hematology/oncology
- Special ethics cases: artificial empathy and patient-facing AI
- Review hematologist/oncologist views on ethics of AI

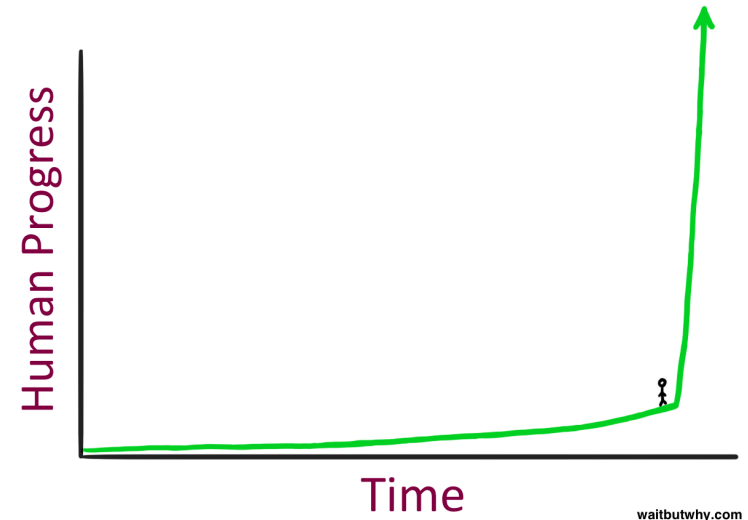


AI and Hematology



The Hematology Future, Coming Soon

- Transformative?
- Revolutionary?
- An Unstoppable Train?
- A Hematology Renaissance?
- A Mess?



“The development of AI is as fundamental as the creation of the personal computer. It will change the way people work, learn, and communicate—and transform healthcare. But it must be managed carefully to ensure its benefits outweigh the risks.” – Bill Gates, 2023



AI Clinical Tools Coming to Hematology

- **Clinician co-pilots**
- **Patient-facing clinical answer engines**
- **Hematopathology optimizers**
- **Treatment optimizers**
- **Clinical trial matchers**
- **Patient visit summarizers**

Radakovich, *Curr Hem Mal Rep*, 2020
Alaoui, *J Med Int R*, 2022
El Alaoui, *JMIR*, 2022
Walter, *Blood Reviews*, 2023



AI Clinical Tools Coming to Hematology

- **Prior authorization writers**
- **Individualized risk assessment tools**
- **Patient digital twins**
- **Hematology supportive care avatars**
- **Billing optimizers**
- **Publication plagiarism analyzers**

Radakovich, *Curr Hem Mal Rep*, 2020
Alaoui, *J Med Int R*, 2022
El Alaoui, *JMIR*, 2022
Walter, *Blood Reviews*, 2023



“Living Up to the Hype” in Hematology

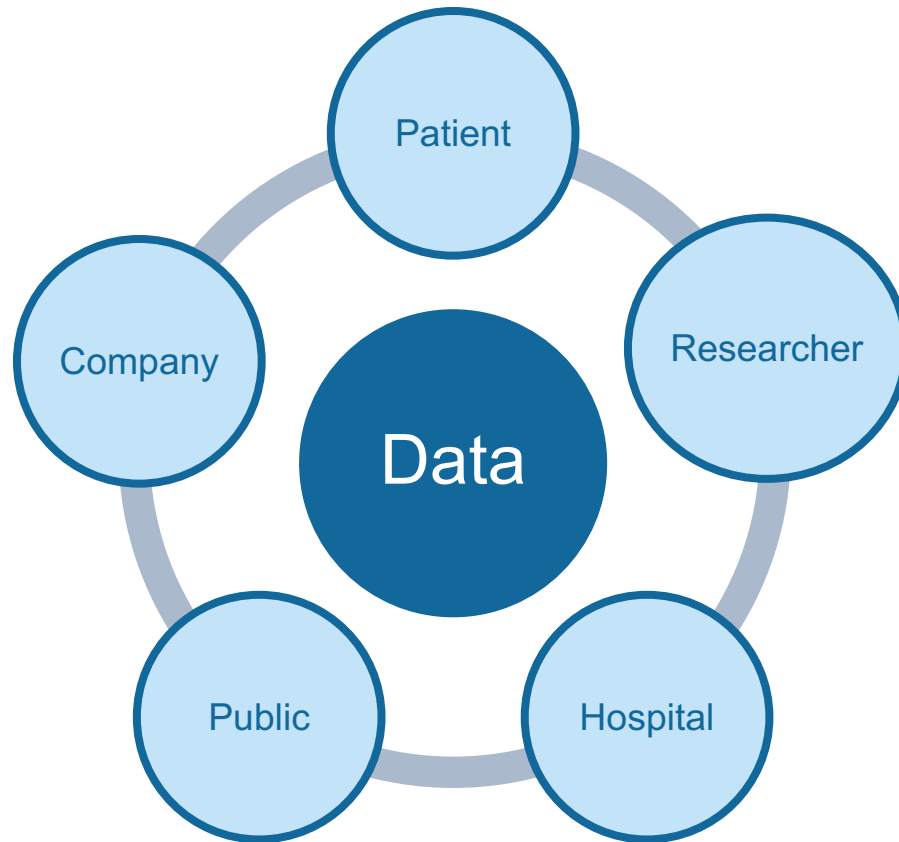
- EHA Congress 2025: Image analysis, biomarker prediction, facilitate tumor boards and even prescribe treatments, with legislative developments suggesting some applications may be close.
 - ★ AI-driven “**ghost cytometry**” enables early diagnosis of CML and prediction of treatment response.
 - ★ Models show high sensitivity, specificity, and accuracy in **diagnosing** APML, interacting with -omics data, blood samples, and cytomorphology.
 - ★ AI-based methods analyze **molecular predictors** in MDS, aiming to improve stratification and guide enrollment in clinical trials.

Mattina, AJMC, 2025



Ethics of AI and Healthcare: the Old and the New

Old: Data Ownership



The Times Sues OpenAI and Microsoft Over A.I. Use of Copyrighted Work

Millions of articles from The New York Times were used to train chatbots that now compete with it, the lawsuit said.



Old: Privacy, Security, Accountability

Non-Health ↔ Health

**Re-Identifiability
(e.g., genetics)**



Old: Patient Safety (Non-Maleficence)

Processes of Safety

Recognition of AI/ML
safety issues



Reporting of AI/ML
safety issues



Managing AI/ML
safety issues



Categories of Safety

Intrinsic vs extrinsic
safety



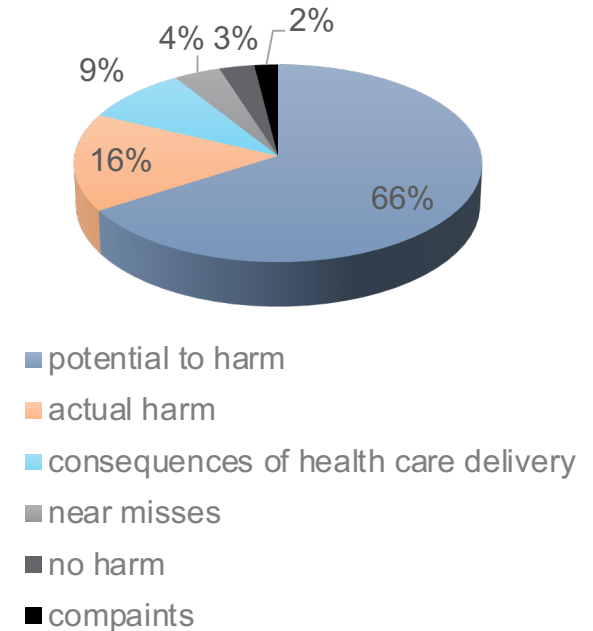
Development vs
implementation
safety



Lyell, *JAMIA* 2022

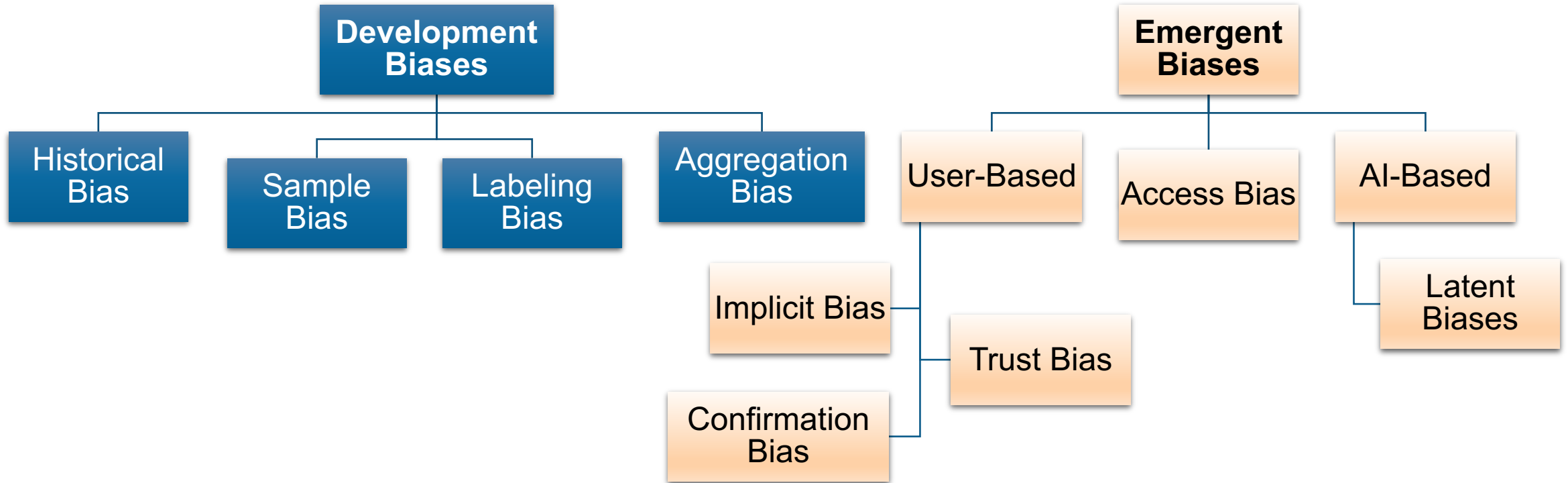
Old: Patient Safety (Non-Maleficence)

- Lyell and colleagues evaluated 266 **safety events** involving approved machine-learning medical devices reported to the US FDA's Manufacture and User Device Experience (MAUDE) program between 2015 and 2021.
- While most events involved **device** problems (93%), **use** problems (7%) were four times more likely to harm (relative risk 4.2; 95% CI 2.5–7). Problems with data input were the top contributor to events (82%).

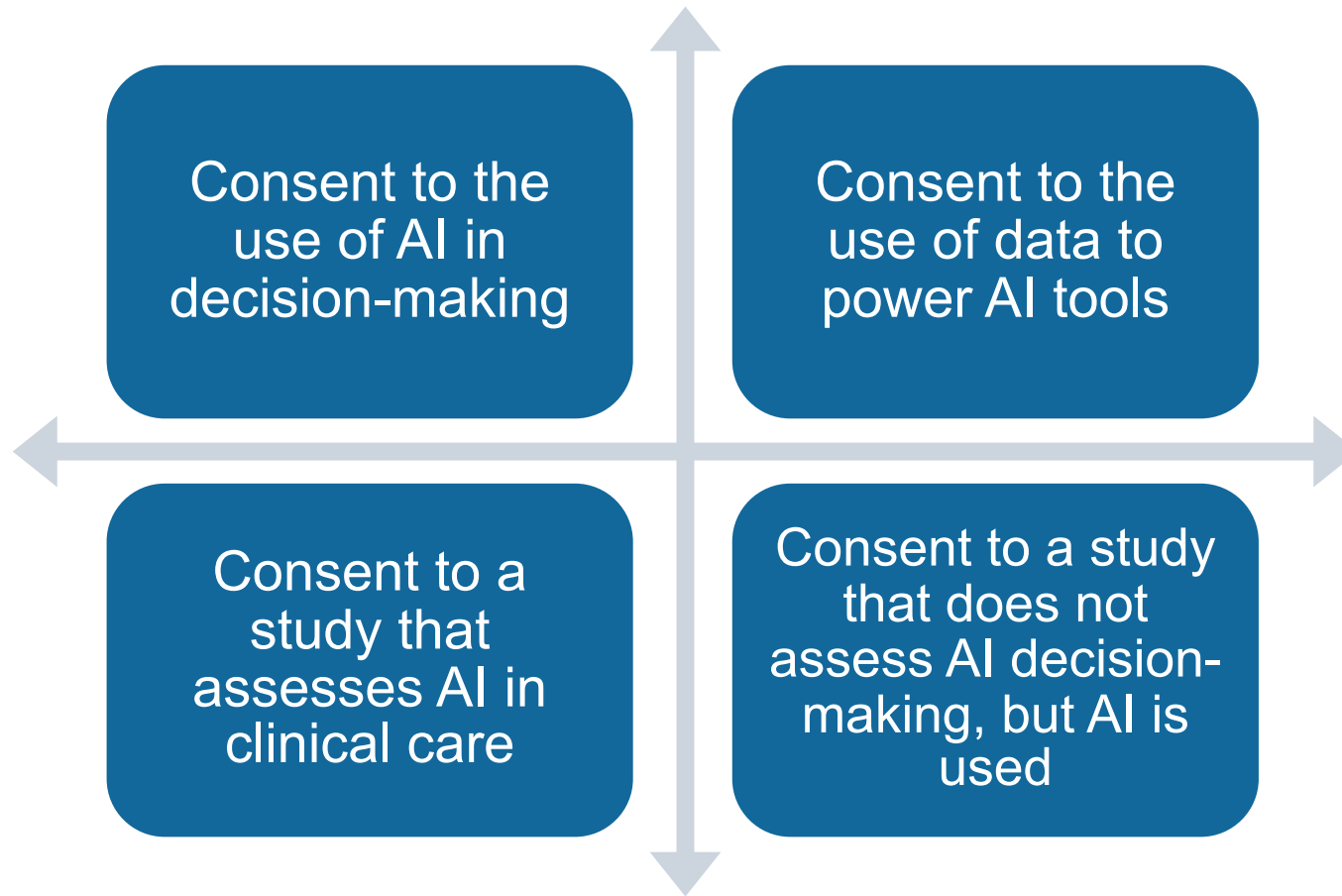


Lyell, *JAMIA* 2022

Old and New: Representativeness and Bias

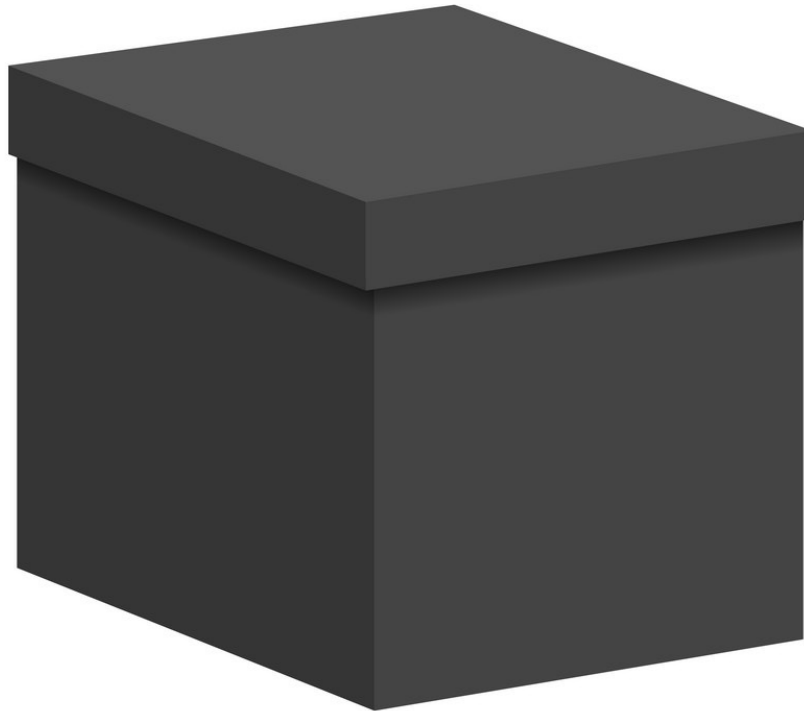


Old and New: Informed Consent

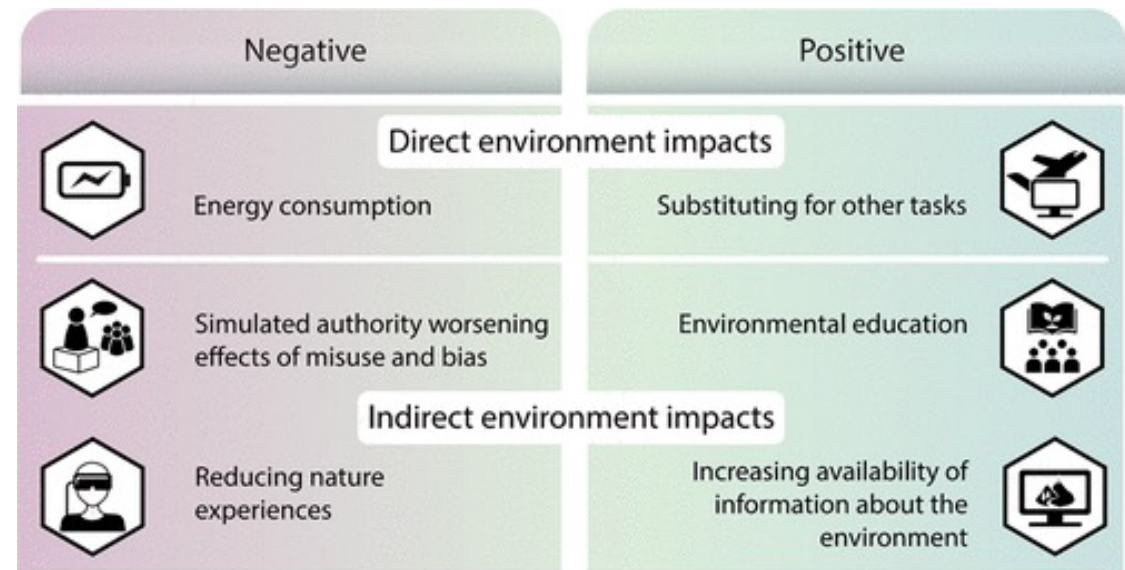
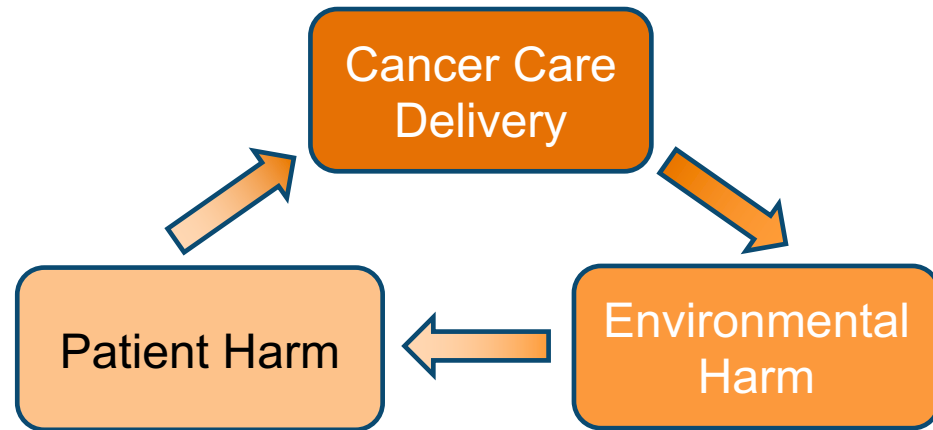




New: Inexplicability of AI Models



New: Environmental Impact



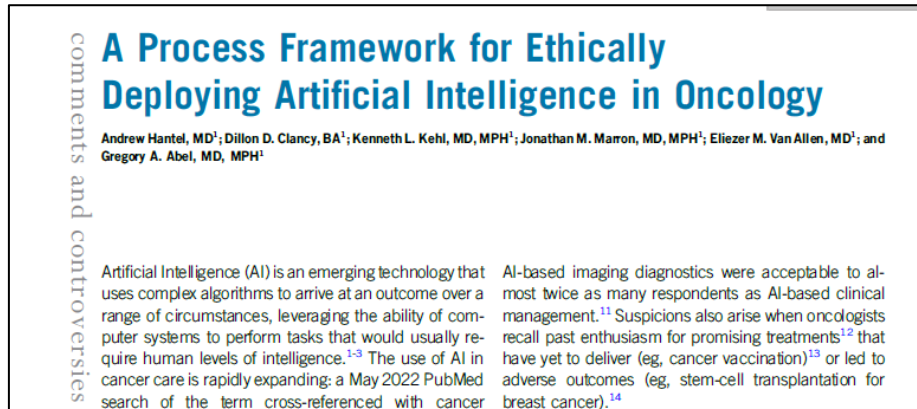
Rilling, *Environ Sci Technol*, 2023
Hantel, *AJOB*, 2024



Ethical Use of AI in Hematology/Oncology



Process Framework



- **Autonomy** in hematology care is interwoven with equity and privacy.
- Lack of defined **processes** for evaluating and disclosing how an AI tool's underlying dataset represents a given population—and what extrapolation is necessary for deriving an outcome or applying it—can magnify even small biases during hematology care.

Hantel, JCO, 2022



Process Framework

- Hematology AI that **minimizes bias** while **maximizing privacy and autonomy** rests upon knowing whose data is intentionally included or excluded and patients consenting to that data use.
- **Process-focused ethical decision frameworks** are useful structures for addressing challenging issues in biomedicine when it is difficult to reach agreement regarding acceptable outcomes.
- They are frequently used for priority-setting during scarce resource allocation—such as drug shortages—where there are competing ethically acceptable outcomes such as treating the youngest or sickest first.



Process Framework

A widely-utilized framework is “**Accountability for Reasonableness**” (A4R), five principles to establish legitimacy of decisions for stakeholders.

- **Relevance**: *decisions should be based on reasons that fair-minded people can agree are relevant under the circumstances;*
- **Publicity**: *decisions and their rationales should be publicly accessible;*
- **Revision**: *there should be opportunities to revisit and revise decisions and mechanisms to resolve disagreements;*
- **Empowerment**: *power differences should be minimized to ensure effective stakeholder participation;*
- **Enforcement**: *there should be voluntary or public regulation to ensure the other conditions are met.*



Artificial Empathy



Artificial Empathy and Human Dignity

“Artificial Empathy”

The ability of nonhuman models to predict a person's internal state given the signals they emit or to predict a person's reaction when they are exposed to a given set of stimuli

Decreasing Social Isolation

Improving Patient-Doctor Relationships

Role Modeling for Humans

Inauthentic Relationship Substitution

Furthering of Social Isolation

Should (Can) Empathy Be Effortless?

Kelkar, *JCO OP*, 2023

Korenteng, *JAMA Onc* 2024

Baumgärtner and Weiss, *Proc of 3rd Int Symp New Frontiers in HRI* 2014

Artificial Empathy and Human Dignity

Opinion

VIEWPOINT

Compassionate Machines The Ethics of “Artificial Empathy” in Cancer Care

Erica Koranteng, MBChB, MBE
Division of Population Sciences, Department of Medical Oncology, Dana-Farber Cancer Institute, Boston, Massachusetts; and Harvard Medical School, Boston, Massachusetts.

“Artificial empathy,” or seemingly compassionate output from artificial intelligence (AI), is increasingly prevalent in health care.¹ The term can appear contradictory and may even be inappropriate because human-to-human interaction seems foundational to empathy. Particularly in oncology, the idea of artificial empathy can evoke discomfort and even disgust because true empathy is a core component of the oncologist-patient relationship. Moreover, the potential of AI to perform

like responses geared toward improving a patient’s experience.¹ Another is in pediatrics, in which avatars programmed with empathy-like language have been used to reduce perceived pain and fear associated with the placement of intravenous lines.³ For these patient-facing applications, reinforcement learning results in even more “empathetic” output over time.

Artificial empathy has the potential to strengthen cancer care, with support during diagnosis, treatment,

- “**Artificial empathy**” may inadvertently result in less human empathy in the hematologist-patient relationship. Genuine empathy requires emotional effort on the part of clinicians.
- Risk of **furthering inequities** in hematology care, as the use of artificial empathy will likely be less costly than human empathy.

Korenteng, *JAMA Onc* 2024



Artificial Empathy and Human Dignity

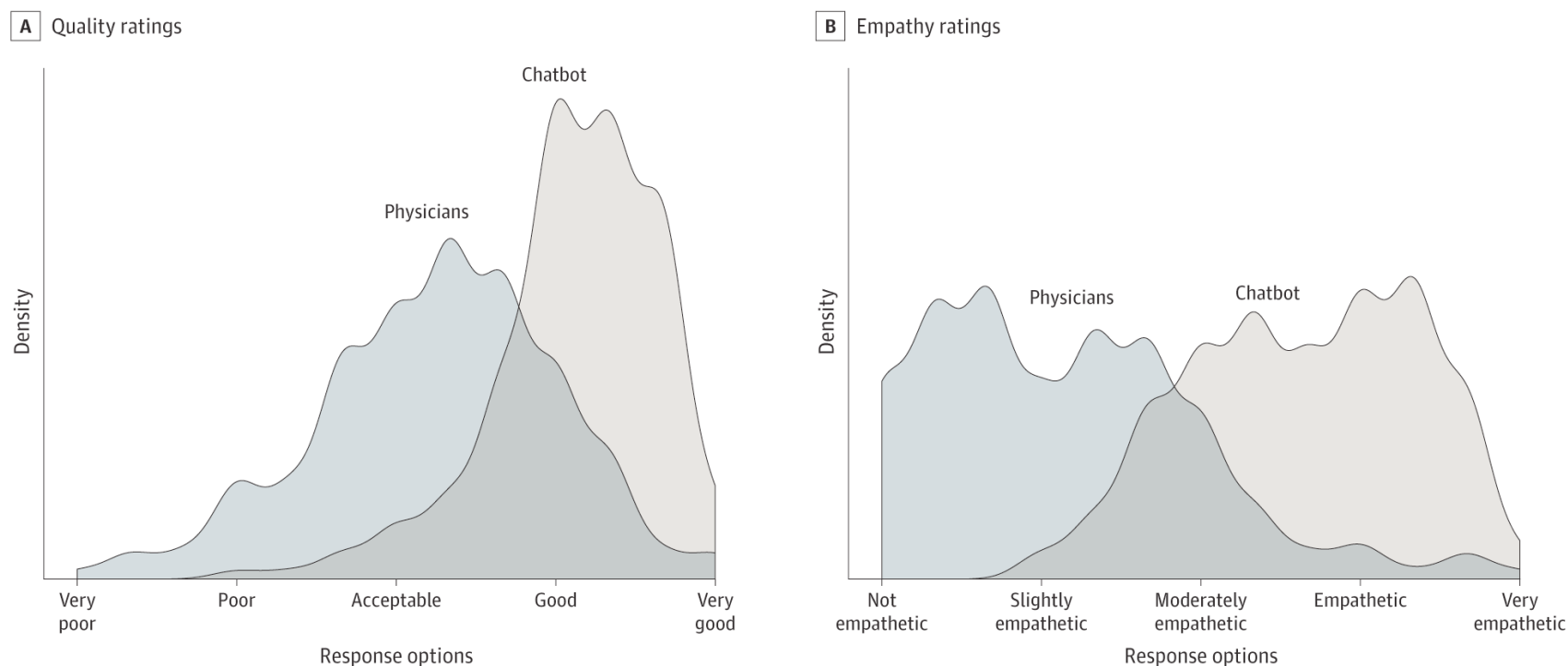
- The use of artificial empathy risks **alienating patients**; replacing opportunities for human with artificial empathy may promote loneliness or make patients feel undeserving of real human interaction.
- Artificial empathy may **influence the behavior of patients** with blood diseases in ways not aligned with their needs. Emotions are recognized heuristics and are known to bias decision-making (e.g.: “nudging”).
- Artificial empathy may **reduce the intrinsic value of empathy**, posing a distinct moral concern.

Korenteng, *JAMA Onc* 2024



Artificial Empathy and Human Dignity

Cross-sectional study: a database of questions from a public social media forum (Reddit's r/AskDocs) was used to randomly draw 195 exchanges where a verified physician responded to a public question. Chatbot responses were generated by entering the original question into a fresh session, and empathy compared by a team of licensed health care professionals.





Patient-Facing AI (PF-AI)



Patient-Facing AI



- Examples of PF-AI: **enhanced telehealth, remote monitoring, virtual health coaching.**
- The transformative potential of PF-AI technologies in hematology is undeniable. These applications can facilitate access, personalize care, improve treatment adherence, and enhance patient engagement.

Kelkar, *JCO OP*, 2023



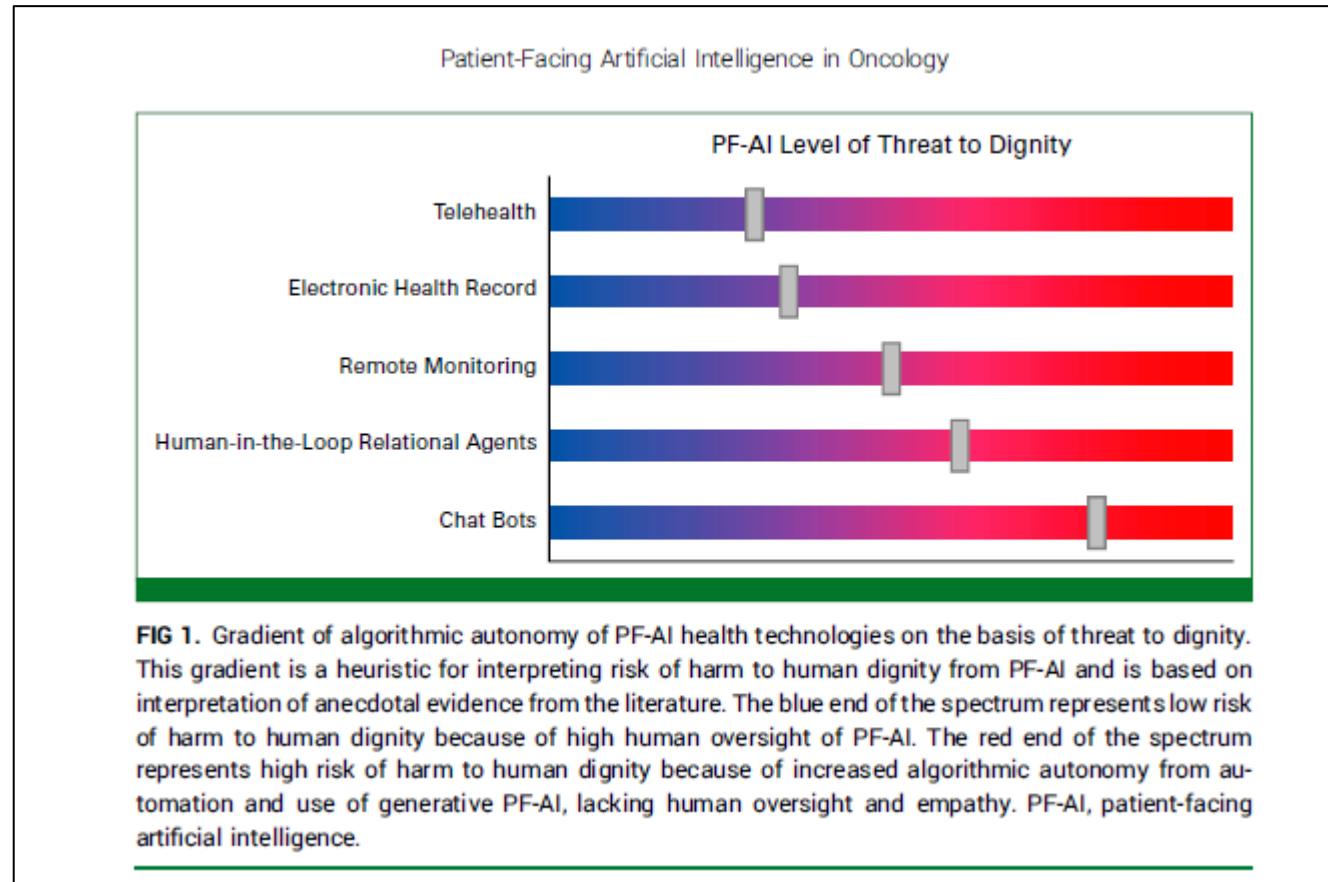
Patient-Facing AI

- PF-AI technologies risk violating **nonmaleficence** because of lack of regulatory oversight, risk for error, and lack of transparency in training data sets and algorithms.
- These models may also disrupt the bioethical principle of **justice**. AI decision making is trained on historical data often generated within structurally inequitable societies: a problem known as **data absenteeism**.
- PF-AI may lead to impersonal care and diminished human touch, **eroding patient dignity** and therapeutic relationships. As we venture further along the AI gradient of algorithmic autonomy, such threats to dignity increase.

Viswanath, *ANNALS of the Am Acad of Poland Soc Sci*, 2022
Kelkar, *JCO OP*, 2023



Patient-Facing AI



Kelkar, JCO OP, 2023



Hematologist/Oncologist Views on Ethics of AI

Clinician's View of Ethics and AI



- **Cross-sectional survey** of U.S. hematologists/oncologists for perspectives on how AI may be responsibly integrated into care and how to protect patients from hidden biases.
- Representative sample of medical hematology/oncology, surgical and radiation oncology specialists; November 2022 to July 2023.
- 204 surveys completed of 387 sent (**52.7%** response rate).

Hantel, *JAMA NO*, 2024

Clinician's View of Ethics and AI

Table 1. Self-Reported Respondent Characteristics

Characteristic	Respondents, No. (%)			P value ^a
	All (N = 204)	Practice setting (n = 202)		
		Academic (n = 60)	Other (n = 142)	
Age group, y				
<40	45 (22.1)	18 (30.0)	27 (19.0)	.12
40-59	112 (54.9)	30 (50.0)	81 (57.0)	
60-80	46 (22.5)	11 (18.3)	34 (23.9)	
>80	1 (0.5)	1 (1.7)	0	
Gender				
Female	72 (35.3)	20 (33.3)	51 (35.9)	.68
Male	130 (63.7)	40 (66.7)	89 (62.7)	
Unknown	2 (1.0)	0	0	
Race and ethnicity				
Asian Indian	34 (16.7)	6 (10.0)	28 (19.7)	.36
Black or African American	9 (4.4)	4 (6.7)	5 (3.5)	
Eastern Asian or Other Pacific Islander	20 (9.8)	5 (8.3)	14 (9.9)	
White	128 (62.7)	42 (70.0)	84 (59.2)	
Other ^b	10 (4.9)	2 (3.3)	8 (5.6)	
≥1 Race	3 (1.5)	0	3 (2.1)	

Table 1. Self-Reported Respondent Characteristics

Characteristic	Respondents, No. (%)			P value ^a
	All (N = 204)	Practice setting (n = 202)		
		Academic (n = 60)	Other (n = 142)	
years in practice				
≤5	33 (16.2)	13 (21.7)	20 (14.1)	.58
6-10	31 (15.2)	10 (16.7)	21 (14.8)	
11-20	74 (36.3)	20 (33.3)	53 (37.3)	
21-30	41 (20.1)	12 (20.0)	28 (19.7)	
≥31	25 (12.3)	5 (8.3)	20 (14.1)	
Oncology specialty				
Medical oncology	126 (61.8)	32 (53.3)	92 (64.8)	.16
Radiation oncology	56 (27.5)	18 (30.0)	38 (26.8)	
Surgical oncology	22 (10.8)	10 (16.7)	12 (8.5)	
Familiar with ≥2 AI model types				
Yes	141 (69.1)	44 (73.3)	96 (67.6)	.45
No	62 (30.4)	15 (25.0)	46 (32.4)	
Unknown	1 (0.5)	1 (1.7)	0	
Prior AI training				
Yes	95 (46.6)	44 (73.3)	50 (35.2)	<.001
No	109 (53.4)	16 (26.7)	92 (64.8)	
Practice setting				
Academic	60 (29.4)	NA	NA	NA
Other	142 (69.6)	NA	NA	NA
Unknown	2 (1.0)	NA	NA	NA

Hantel, JAMA NO, 2024



Clinician's View of Ethics and AI

- Most respondents felt AI would be helpful in hematology/oncology care.
- AI was felt to potentially help in **diagnosing** (95.6%), **treating** (89.2%), and **managing side effects** (60.4%).
- **84.8%** reported AI needs to be “explainable” by oncologists.
- Only **23.0%** reported AI needs to be “explainable” by patients.
- **76.5%** reported feeling responsible for protecting patients from biased models.

Hantel, *JAMA NO*, 2024



Clinician's View of Ethics and AI

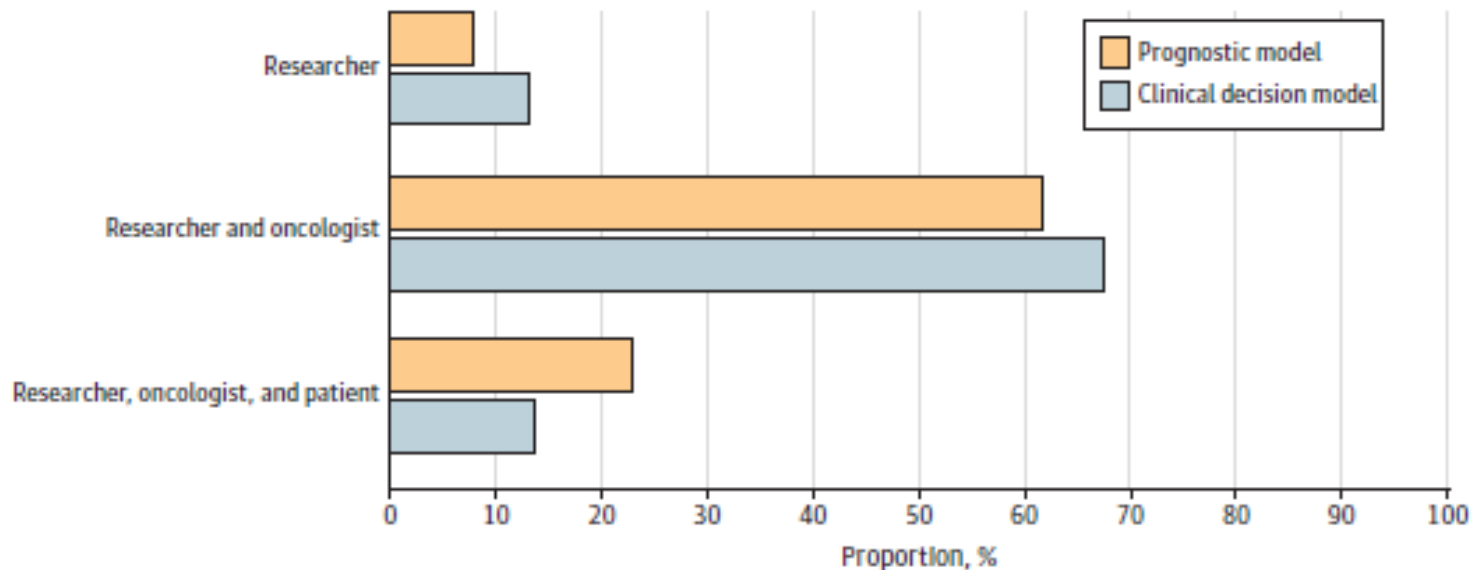
- **81.4%** felt patients should consent to AI for cancer treatment decisions.
- **47.1%** viewed medico-legal problems from AI use as physicians' responsibility; **90.7%** felt AI developers should bear this responsibility.
- Only **27.9%** reported feeling confident in their ability to protect patients from biased AI.
- **93.1%** reported they would benefit from AI training but **75.0%** did not know how to access appropriate resources.

Hantel, *JAMA NO*, 2024



Clinician's View of Ethics and AI

Figure 1. Responses to 2 Questions Assessing Which Stakeholder Types (Researcher, Oncologist, or Patient) Should Be Able to Explain an Artificial Intelligence Model for It to Be Used in Clinic

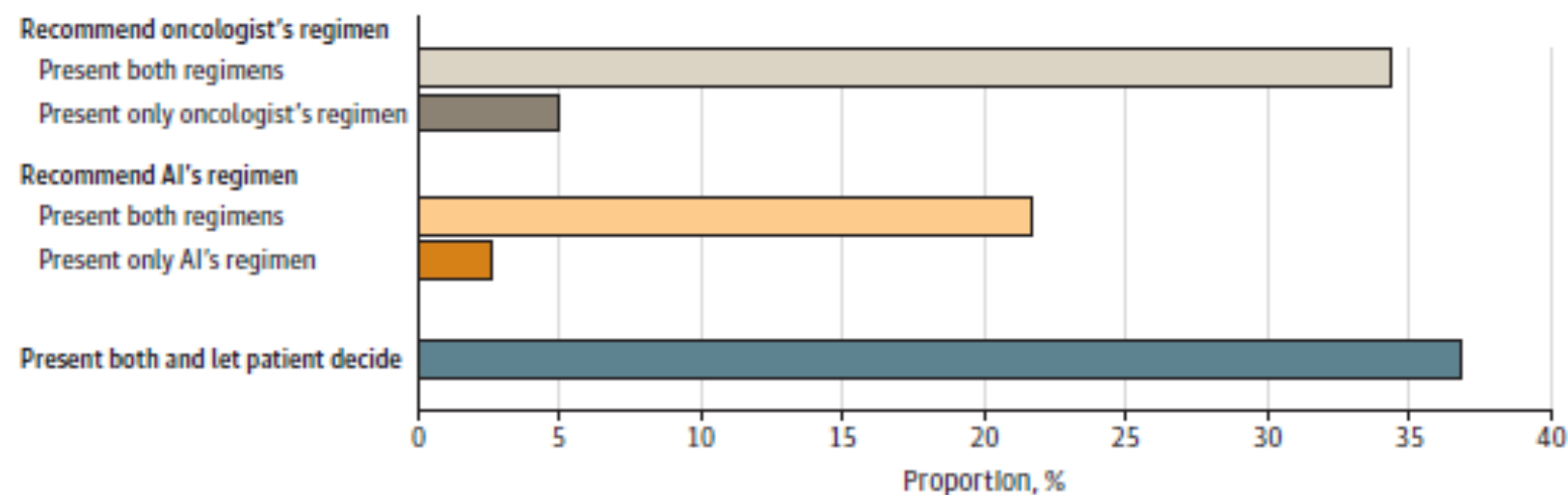


Hantel, JAMA NO, 2024



Clinician's View of Ethics and AI

Figure 2. Responses to a Scenario Where a US Food and Drug Administration–Approved Artificial Intelligence (AI) Model Selects a Different Regimen Than the Oncologist Planned to Recommend



Hantel, *JAMA NO*, 2024



Clinician's View of Ethics and AI

- Results highlights potential issues related to **accountability** and **deference** to AI as well as associations with practice setting.
- Findings provide a glance at where hematologist/oncologists are in thinking about the ethical implications of AI in cancer care.
- Suggest implementation of AI in the field of hemato-oncology must include **rigorous assessments of its effect on care decisions and decisional responsibility** when problems related to AI use arise.
- Need for training for clinicians.

Hantel, *JAMA NO*, 2024

Patient's View of Ethics and AI

No. _____

 **Dana-Farber** Cancer Institute  Beth Israel Lahey Health
 Beth Israel Deaconess Medical Center

Patient Views on Artificial Intelligence in Cancer Care

We are seeking to better understand patients' views on artificial intelligence (AI) in cancer care. Your input will help us identify and address patients' concerns as artificial intelligence tools are used in cancer care. **You do not need any prior knowledge of AI to complete this survey.**

- This **one-time survey** will take approximately **10 minutes** to complete.
- Your participation is voluntary, and will not impact your care in any way.
- Your answers will be kept confidential. **You will only be identified by the number on your survey.**
- If you do not want to complete the survey, please mail back the postcard included in this packet or call the study staff at 857-215-0131 so that we are aware.
- If you come across a question you would rather not answer, it is okay to skip it and go on to the next question.
- If you have any questions please contact Dr. Eric Blackstone, PhD at 857-215-0131 or by email at Eric.Blackstone@dfci.harvard.edu.

When you have completed the survey, please place it in the pre-stamped and addressed envelope provided and mail it back.

13. I would trust artificial intelligence to help doctors with ...
Select one response per row.

	Strongly Disagree	Disagree	Agree	Strongly Agree
... predicting my risk of getting cancer.	☐	☐	☐	☐
... telling me if I need cancer screening.	☐	☐	☐	☐
... choosing the best treatment option for my cancer.	☐	☐	☐	☐
... detecting if my cancer is getting worse.	☐	☐	☐	☐
... recommending a clinical trial.	☐	☐	☐	☐
... predicting how long I will live.	☐	☐	☐	☐

14. It is important that these people can explain how a cancer-focused artificial intelligence tool works:
Select one response per row.

	Strongly Disagree	Disagree	Agree	Strongly Agree
AI Developers	☐	☐	☐	☐
Oncologists	☐	☐	☐	☐
Patients	☐	☐	☐	☐

15. I would feel comfortable using the following artificial intelligence tools without a healthcare provider.
Select one or more.

- ☐ A tool that writes a summary of my doctor's notes so I can understand them
- ☐ A tool that helps me find clinical trials for cancer treatment
- ☐ A tool that gives me advice on things like exercise or nutrition
- ☐ A tool that helps me make medical decisions (for example, deciding if I should have a spot on my skin examined for cancer)

CONTINUE TO THE NEXT PAGE



Abel Lab 2025

Andrew Hantel, MD, MPH
Clark DuMontier, MD, MPH
Amar Kelkar, MD, MPH
Erica Koranteng, MD, MBE
Eric Blackstone, PhD
Angel Cronin, MS
Oldy Bejarano, MPH
Abby Shain, MS, MPH
Sunny Rosenthal, MPH
Mark Soliman, MS
Nicholas Groblewski
Ameya Sanyal
Erin Gallagher
Jessica Santos

